

Specifications

| | |
|--------------|----------------------------|
| Drawing No. | UKY1C-H1-23606-00[37] 1/12 |
| Issued Date. | Jun.27,2023 |

TO: Digi-Key

Note: Part numbers may be revised in the event of any specifications change.

| | |
|-------------------------------|--|
| Product Type | Quartz Crystal |
| Series | CX2016SA |
| Frequency | Refer to Doc No. UKY1C-H1-23606-00[37] Page 3/12 |
| Customer Part Number | - |
| Customer Specification Number | - |
| KYOCERA Part Number | Refer to Doc No. UKY1C-H1-23606-00[37] Page 3/12 |
| Remarks | Pb-Free, RoHS Compliant, MSL 1 AEC-Q200 Compliant |

Customer Approval

| | | |
|--------------------|------------------|--|
| Approval Signature | Approved Date | |
| | Department | |
| | Person in charge | |


Seller

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| | | | | | |
|--|-------------------|-------------|------------|------------|---|
| Design Department | Quality Assurance | Approved by | Checked by | Checked by | Issued by |
| KYOCERA Corporation Crystal Components Application Engineering Section1 Electronic Devices Division Corporate Electronic Components Group | A. Ito | W. Muraoka | F. Horie | T. Saito | Y. Kikuchi  |

KYOCERA Corporation

Revision History

| Rev.No. | Description of revision | Date | Approved by | Checked by | Issued by |
|---------|-------------------------|-------------|-------------|------------|------------|
| 00 | First Edition | Jun.27,2023 | W. Muraoka | F. Horie | Y. Kikuchi |
| | | | | | |

【Part Number list】

| Nominal Frequency (MHz) (*1) | KYOCERA Part Number | ESR (Ω) (*2) | Nominal Frequency Code (*3) |
|------------------------------|----------------------|--------------|-----------------------------|
| 20.000 | CX2016SA20000B0KSRCC | 150 | 20000 |
| 30.000 | CX2016SA30000B0KSRCC | 60 | 30000 |
| 50.000 | CX2016SA50000B0KSRCC | 50 | 50000 |

1. APPLICATION

This specification sheet is applied to quartz crystal

2. KYOCERA PART NUMBER

Refer to Doc No. UKY1C-H1-23606-00[37] Page 3/12

3. RATINGS

| Items | SYMB. | Rating | Unit | Remarks |
|-----------------------------|-------|-------------|------|---------|
| Operating Temperature Range | Topr | -40 to +125 | °C | |
| Storage Temperature Range | Tstg | -40 to +125 | °C | |

4. CHARACTERISTICS

ELECTRICAL CHARACTERISTICS

| Items | Electrical Specification | | | | | Test Condition | Remarks |
|---------------------------------------|--------------------------|-------------|------|-------|------|----------------------|---|
| | SYMB. | Min | Typ. | Max | Unit | | |
| Mode of Vibration | | Fundamental | | | | | |
| Nominal Frequency | F0 | | (*1) | | MHz | | |
| Nominal Temperature | T _{NOM} | | +25 | | °C | | |
| Load Capacitance | CL | 6.0 | | | pF | | |
| Frequency Tolerance | df/F | -30.0 | | +30.0 | PPM | +25±3°C | by Measurement Conditions |
| Frequency Temperature Characteristics | df/F | -40.0 | | +40.0 | | -40 to +125°C | Based on an oscillation frequency at +25 °C |
| Frequency Aging Rate | | -2.0 | | +2.0 | | 1 st year | +25±3°C |
| Equivalent Series Resistance | ESR | | | (*2) | Ω | | by Measurement Conditions |
| Drive Level | Pd | 0.01 | | 200 | μW | | |
| Insulation Resistance | IR | 500 | | | MΩ | 100V(DC) | |

*1 *2 Refer to Doc No. UKY1C-H1-23606-00[37] Page 3/12

5. Measurement Condition

5.1 Frequency measurement

Measuring instrument : IEC PI-Network Test Fixture

Load Capacitance : 6.0pF

Drive Level : 10 μ W

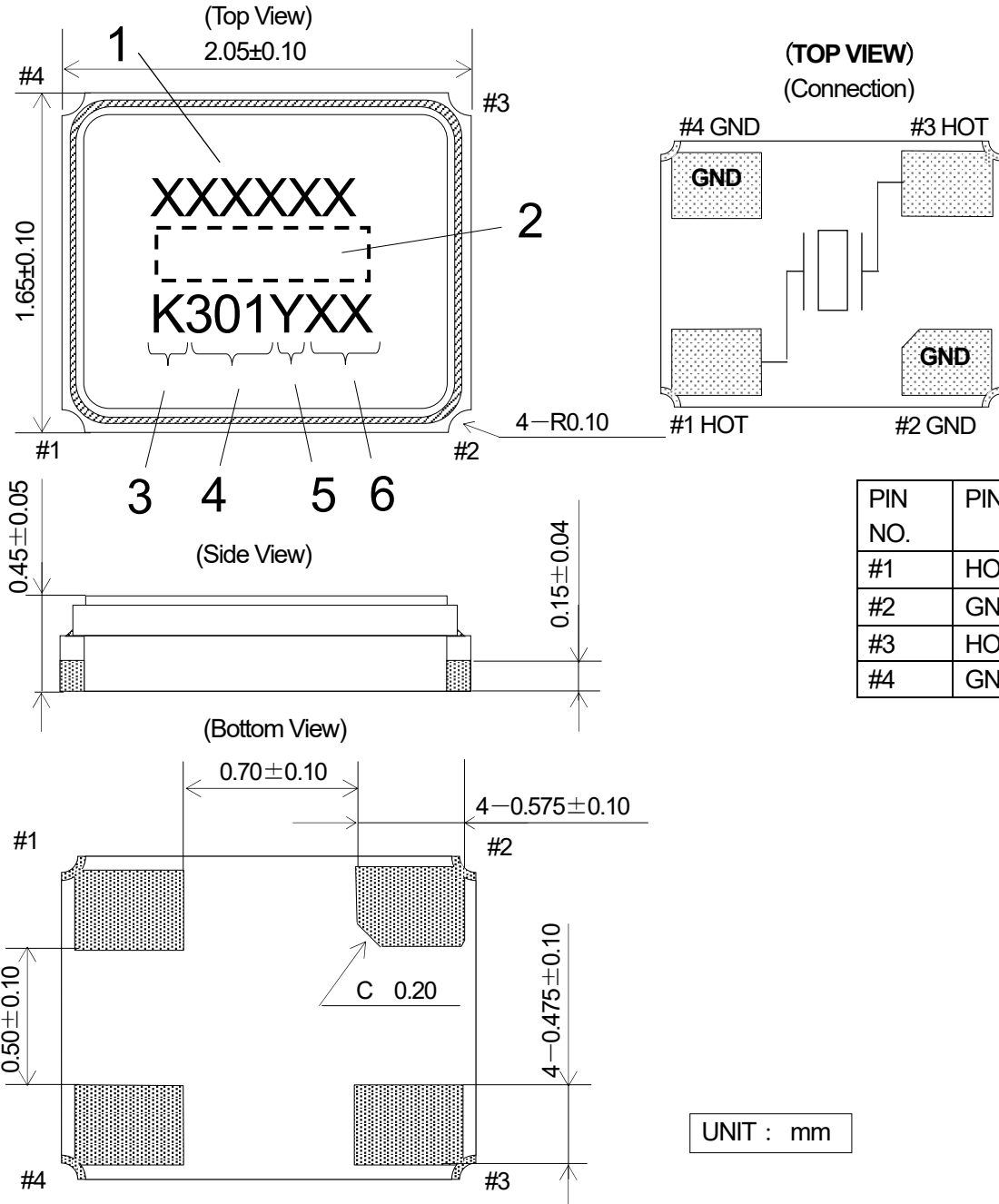
5.2 Equivalent series resistance (ESR) measurement

Measuring instrument : IEC PI-Network Test Fixture

Load Capacitance : Series

Drive Level : 10 μ W

6. APPEARANCES, DIMENSIONS
OUTLINE DIMENSION (not to scale)



| PIN NO. | PIN Layout |
|---------|------------|
| #1 | HOT |
| #2 | GND |
| #3 | HOT |
| #4 | GND |

UNIT : mm

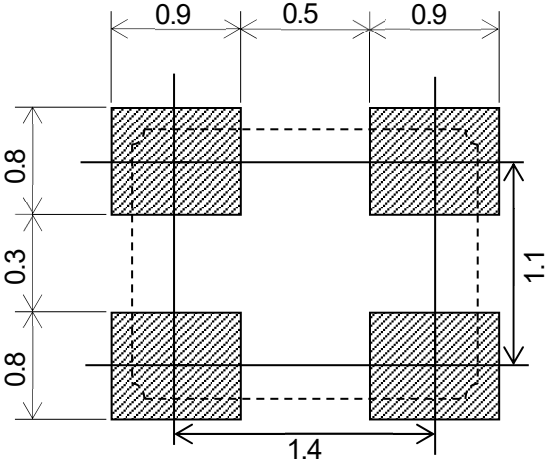
MARKING

- 1. Serial Code 6Digits
- 2. Nominal Frequency First 5digit of the frequency is indicated.
 *3 Refer to Doc No. UKY1C-H1-23606-00[37] Page 3/12
- 3. Identification [K] is to indicate 1Pin direction.
- 4. Date Code Last 1 Digit of YEAR and WEEK
 (Ex) 2023,Jan,01 → 301
- 5. Manufacturing Location Y··Japan (Yamagata)
 Z··Japan (Shiga Yohkaichi)
 V··Vietnam
- 6. Internal code

※The font of marking is for reference only.

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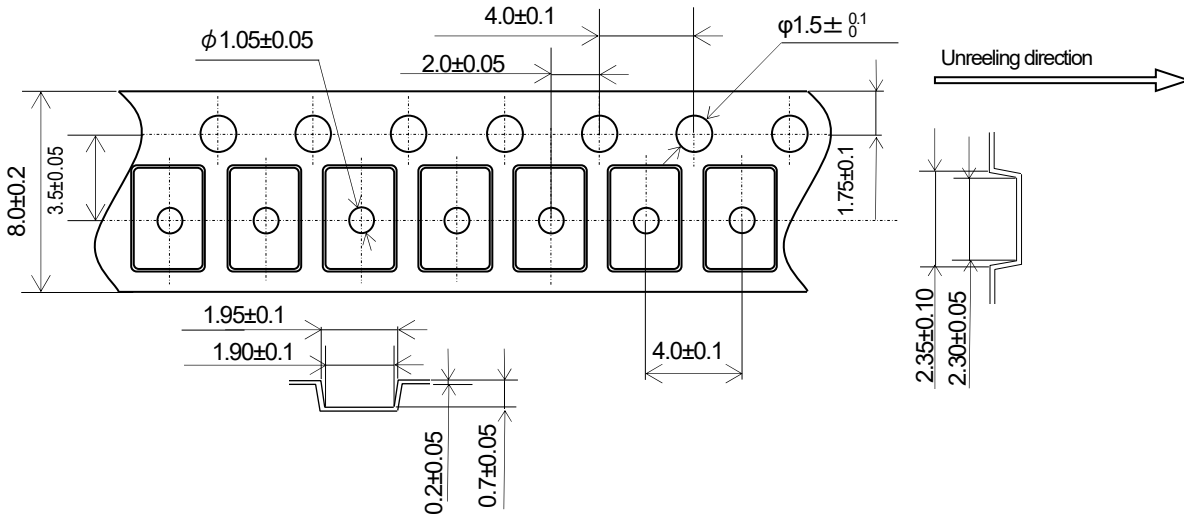
7. RECOMMENDED LAND PATTERN (not to scale)



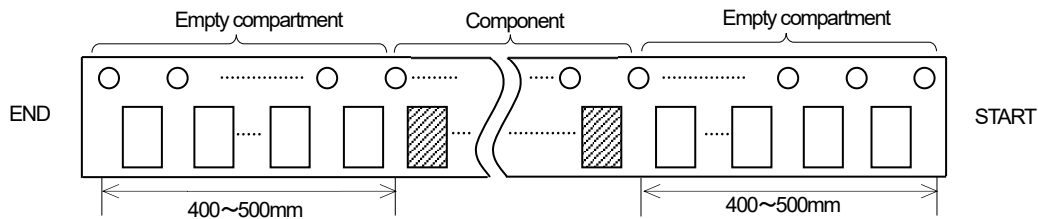
UNIT : mm

8. TAPING & REEL

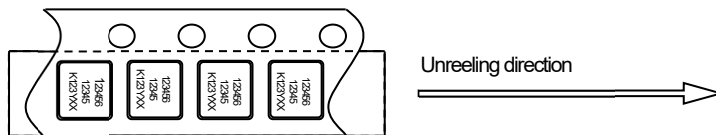
8-1. Dimensions



8-2. Leader and trailer tape

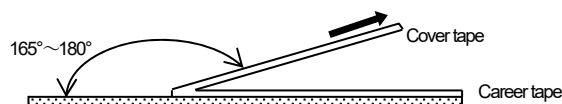


8-3. Direction (The direction shall be seen from the top cover tape side)

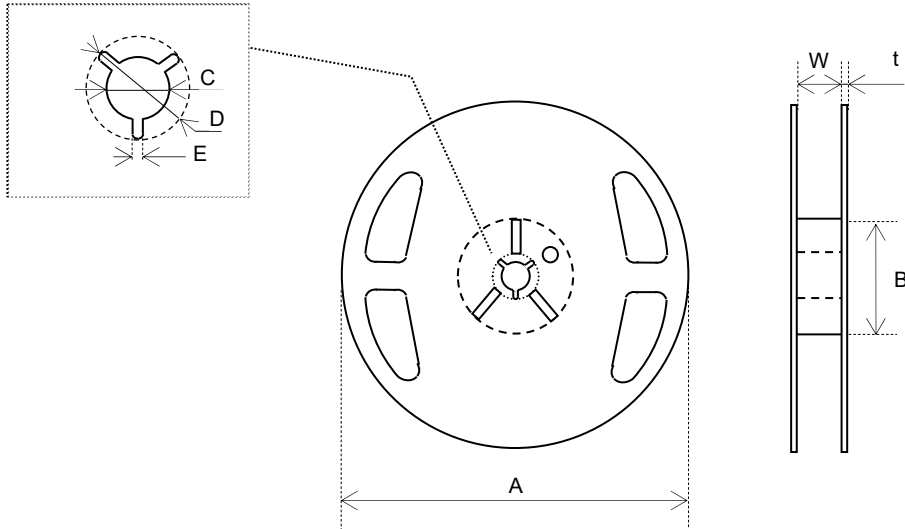


8-4. Specification

1. Material of the carrier tape is either polystyrene or A—PET (ESD).
2. Material of the cover tape is PET/PE (ESD).
3. The seal tape shall not cover the sprocket holes and not protrude from the carrier tape.
4. Tensile strength of carrier tape: 10N or more.
5. The R of the corner of each cavity is $0.2R_{MAX}$.
6. The alignment between centers of the cavity and sprocket hole shall be 0.05mm or less.
7. The orientation shall be checked from the top cover tape side as shown in 8-3.
8. Peeling force of cover tape: 0.1 to 1.0N.
9. The component will fall out naturally when cover tape is removed and set upside down.



8-5.Reel Specification



φ180 Reel (3,000pcs Max)

| | | | | |
|-----------|------------|-----------|---------|---------|
| Symbol | A | B | C | D |
| Dimension | φ180 +0/-3 | φ60 +1/-0 | φ13±0.2 | φ21±0.8 |
| Symbol | E | W | t | |
| Dimension | 2.0±0.5 | 9±1 | 2.0±0.5 | |

(Unit : mm)

φ330 Reel (15,000pcs Max)

| | | | | |
|-----------|----------|----------|---------|---------|
| Symbol | A | B | C | D |
| Dimension | φ330±2.0 | φ100±1.0 | φ13±0.2 | φ21±0.8 |
| Symbol | E | W | t | |
| Dimension | 2.0±0.5 | 9.5±0.5 | 2.2±0.1 | |

(Unit : mm)

9. ENVIRONMENTAL AND MECHANICAL CHARACTERISTICS :

(Reference: AEC-Q200 Rev. D. The solder used by examination is hereafter set to Sn-3Ag-0.5Cu.)

After following test, frequency shall not change more than $\pm 10 \times 10^{-6}$ and CI, $\pm 20\%$ or 5Ω .

| No | Stress | Reference | Additional Requirements |
|------|-------------------------------------|------------------------|---|
| 9.1 | High Temperature Exposure (Storage) | MIL-STD-202 Method 108 | 1000 hrs. at rated operating temperature (e.g. 85°C part can be stored for 1000 hours at 85°C. Same applies for 125°C). Unpowered. Measurement at 24±4 hours after test conclusion. |
| 9.2 | Temperature Cycling | JESD22 Method JA-104 | 1000 cycles (-40°C to 125°C) Note: If 85°C parts the 1000 cycles will be at that temperature rating. Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme. 1 min. maximum transition time. |
| 9.3 | Biased Humidity | MIL-STD-202 Method 103 | 1000 hours 85°C/85%RH. Rated VDD applied with 1MΩ and inverter in parallel, 2X crystal CL capacitors between each crystal leg and GND. Measurement at 24±4 hours after test conclusion. |
| 9.4 | Operational Life | MIL-STD-202 Method 108 | Note: 1000 hours @ 125°C. If 85°C part will be tested at that temperature. Rated VDD applied with 1 MΩ and inverter in parallel, 2X crystal CL capacitors between each crystal leg and GND. Measurement at 24±4 hours after test conclusion. |
| 9.5 | Resistance to Solvents | MIL-STD-202 Method 215 | Note: Also aqueous wash chemical - OKEM clean or equivalent. Do not use banned solvents. |
| 9.6 | Mechanical Shock | MIL-STD-202 Method 213 | Figure 1 of Method 213. Condition C |
| 9.7 | Vibration | MIL-STD-202 Method 204 | 5g's for 20 minutes 12 cycles each of 3 orientations. Note: Use 8"X5" PCB .031" thick with 7 secure points on one 8" side and 2 secure points on corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000 Hz. |
| 9.8 | Resistance to Soldering Heat | MIL-STD-202 Method 210 | Condition B. No pre-heat of samples. Solder temp: $260 \pm 5^\circ\text{C}$, Soaking time: $10 \pm 1\text{sec}$, Number of tests: 1 Note: The electrodes are immersed in molten solder to a level that covers the electrodes of the component. |
| 9.9 | Solder ability | J-STD-002 | Evaluate the solderability of external electrodes of components. Conditions (SMD): Method D category 3, Solder temp: $260 \pm 5^\circ\text{C}$, Soaking time: 30+5/-0sec. |
| 9.10 | Board Flex | AEC Q200-005 | Maintain a bend depth of 2 mm for 60 seconds. Note: Use FR4 substrate with external dimensions of 100 x 40 mm and thickness of $1.6 \pm 0.2\text{ mm}$. |
| 9.11 | Terminal Strength (SMD) | AEC Q200-006 | A pushing force of 17.7 N perpendicular to the side of the specimen on the test substrate is applied for 60 seconds |

10. Soldering condition

- 1.) Material of solder
 Kind ... lead free solder paste
 Melting point ... $+220\pm 5^{\circ}\text{C}$

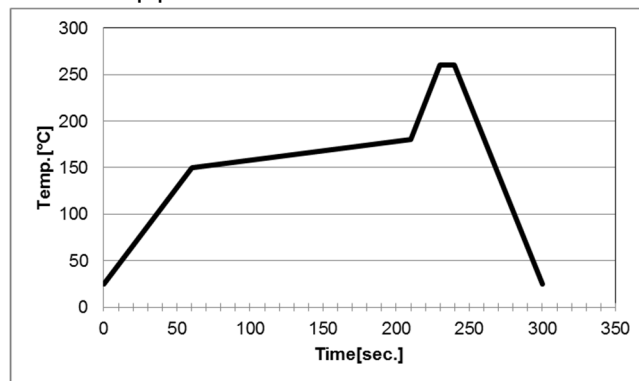
- 2.) Reflow temp.profile

| | Temp [$^{\circ}\text{C}$] | Time[sec] |
|------------|-----------------------------|------------|
| Preheating | +150 to +180 | 150 (typ.) |
| Peak | $+260\pm 5$ | 10 (max.) |
| Total | — | 300 (max.) |

Frequency shift : $\pm 2\text{ppm}$

- 3.) Hand Soldering $+350^{\circ}\text{C}$ 3 sec MAX
- 4.) Reflow Times 2 times

Reflow temp.profile



11. Cautions for use

- (1) Soldering upon mounting
 There is a possibility to influence product characteristics when Solder paste or conductive glue comes in contact with product lid or surface.
- (2) When using mounting machine
 Please minimize the shock when using mounting machine to avoid any excess stress to the product.
- (3) Conformity of a circuit
 We strongly recommend to make sure that Negative resistance (Gain) of IC is designed to be 10 times the ESR (Equivalent Series Resistance) of crystal unit.

12. Storage conditions

Please store product in below conditions, and use within 6 months.
 Temperature $+18$ to $+30^{\circ}\text{C}$, and Humidity of 20 to 70 % in the packaging condition.

13. Manufacturing location

Kyocera Corporation Yamagata Higashine Plant / Japan(Yamagata)
 Kyocera Corporation Shiga Yohkaichi Plant / Japan(Shiga)
 Kyocera Vietnam Co., LTD. / Vietnam

14. Quality Assurance

To be guaranteed by Kyocera Corporation Yamagata Higashine Plant Quality Assurance Division

15. Quality guarantee

In case when Kyocera Corporation rooted failure occurred within 1year after its delivery, substitute product will be arranged based on discussion. Quality guarantee of product after 1year of its delivery is waived.

16. Others

In case of any questions or opinions regarding the Specification, please have it in written manner within 45 days after issued date.